

DEPARTMENT OF PHYSICS AND ASTRONOMY

PHYS 485: PROFESSIONAL ETHICS FOR PHYSICISTS

Instructor: Joshua E. Barnes
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Campus Office: Wat. 402
Office Hours: Friday, 13:30 – 15:20

Semester: Fall, 2023
Meeting: Friday, 15:30 – 16:20
Website: Google Classroom – code `hkxbcoq`

Room: PSB 211
Final: 12/13, 16:30 – 18:30
Credits: 1 [E,O]

I. COURSE DESCRIPTION

Overview. The aim of this course is to develop a clear understanding of ethical standards in scientific research, collaborations, and communications. The primary goals of this course are for you to be able to:

- (1) identify ethical issues in modern physical science,
- (2) use a decision-making process for appropriate and efficient resolution of ethical challenges,
- (3) develop a set of study, work, and professional norms that avoid ethical problems.

This one-credit class is devoted to ethical issues, emphasizing contemporary topics. At least 8 hours of class time will be used to discuss ethics.

Active Learning. This course is taught in an active learning style that is based on short lectures infused with questions and discussions that are carried out within small groups or with the class as a whole. This active learning environment (also known as inquiry-based learning or peer-centered learning) has been proven in numerous studies in both physics and astronomy to lead to a much greater understanding of the concepts than even the most engaging traditional lecture. The four-word summary of this approach is that **you learn by doing**.

II. COURSE INFORMATION, POLICIES AND RESOURCES

Ethical Issues (E) Focus. This course has a Contemporary Ethical Issues (E) Focus designation. Contemporary ethical issues are fully integrated into the main course material and will constitute at least 30% of the content. At least 8 hours of class time will be spent discussing ethical issues. Through the use of lectures, discussions and assignments, students will develop basic competency in recognizing and analyzing ethical issues; responsibly deliberating on ethical issues; and making ethically determined judgments.

Oral Communications (O) Focus. This course has an Oral Communications (O) Focus designation. Each student will conduct or participate in a minimum of three oral communication assignments or a comparable amount of oral communication activity during the class. 100% of the final grade will be a function of the student's oral communication activities; only students who satisfactorily complete the oral communication assignments will be allowed to pass the course with a "D" or better. Each student will receive explicit training in oral communication concerns relevant to the assignment.

Attendance Policy. Students who are enrolled in this course, but never attend will be flagged by the course instructor for non-participation before the last day to add/drop (for 100% tuition refund) deadline. Flagged students will be administratively dropped by the Office of the Registrar. Any changes to a student's enrollment status may affect financial aid eligibility and can result in the return of some of all of federal student financial aid.

Statement on Disability: KOKUA Program. If you have a disability and related access needs, please contact the KOKUA Program (Office for Students with Disabilities) at 956-7511, KOKUA@hawaii.edu, or go to Room 013 in the Queen Lili'uokalani Center for Student Services. Please know that I will work with you and KOKUA to meet your access needs based on disability documentation. Kokuia's services are confidential and offered free of charge.

Academic Integrity and Ethical Behavior: Office of Student Conduct. Cheating, plagiarism, or other forms of academic dishonesty are not permitted within this course and are prohibited within the System-wide Student Conduct Code (EP 7.208). Examples include: fabrication, facilitation, cheating, plagiarism, and use of improper materials. Any incident of suspected academic dishonesty will be reported to the Office of Student Conduct for review and possible adjudication. Additionally, the instructor may take action in regards to the grade for the deliverable or course as they see fit.

Office of Title IX. (808) 956-2299 | t9uhm@hawaii.edu | <https://manoa.hawaii.edu/titleix/>
See details on page 6.

Department of Public Safety. (808) 956-6911 (Emergency) | (808) 956-8211 (Non-Emergency)
| <http://manoa.hawaii.edu/dps/>

UH System Basic Needs. These include food and housing, childcare, mental health, financial resources and transportation, among others. Student basic needs security is critical for ensuring strong academic performance, persistence and graduation and overall student well being. If you or someone you know are experiencing basic needs insecurity, please see the following resources: <https://www.hawaii.edu/student-basic-needs/resources/manoa/> (UH System Basic Needs).

III. COURSE CONTENT AND LEARNING OBJECTIVES

COURSE CONTENT

The following outlines the “big picture” concepts that you should understand by the end of this course. Some of these are specific to the physical sciences, some are more general understandings of the practice of science and how we discover how the universe works, and others are more broadly applicable in daily life.

- Understand sources of ethical standards and their application in science.
- Use frameworks for ethical reasoning.
- Practice ethical reasoning via classroom discussion. Physical science offers a wide range of ethical issues, which can be broadly organized into three categories. Here we list these categories and illustrate them with a few examples:
 - **Public policy.** Climate change due to human activity is arguably the most critical current issue; topics for discussion include the nature of scientific consensus, communication with the public, and ethics of geo-engineering (deliberate modification of the Earth on a global scale).

- **Research conduct.** Outright fakery of experimental results is rare but not unknown. More subtle issues include cherry-picking of data, confirmation bias (structuring experiments to support preconceived ideas), and carelessness in excluding sources of error.
- **Interpersonal conduct.** Examples include power dynamics (eg., Jocelyn Bell Burnell discovered pulsars; her advisor got the Nobel Prize), appropriate vs. inappropriate peer review, allocation of credit, and sexual harassment (eg., Geoff Marcy and his enablers).

INSTITUTIONAL LEARNING OBJECTIVES

The course outcomes are aligned with the following University of Hawaii Institutional Learning Objectives for Undergraduate Students (<http://manoa.hawaii.edu/ovcaa/ilo/>):

- gives an understanding of professional practices in science (objective 1b),
- provides continuous practice with critical and creative ethical thinking: solving challenging and complex problems, applying questioning and reasoning, generating and exploring new questions, and information literacy (objective 2a),
- applies research practices to ethical thinking: conceptualizing problems and asking research questions, analyzing data relevant to ethical situations, engaging in self-directed inquiry, and using library and information systems (objective 2b),
- provides training in effective oral communication and integrates in-class collaborative work (objective 2c),
- provides practice in ethical thinking through the analysis of historical situations and hypothetical future experiences (objective 3a),
- provides practice in considering the viewpoints of others (objective 3b),
- provides practice in the consideration of the use of, impact on, and management of natural resources as part of a broader ethical framework (objective 3c), and
- provides practice in the examination of the interaction between the scientific community and other communities (objective 3d)

PROGRAM LEARNING OBJECTIVES

Our BA and BS Physics program learning objectives are:

- Apply basic physical principles from a broad range of topics in physics to diverse scientific and technological problems.
- Be able to formulate scientific problems in mathematical terms and apply analytical and numerical methods towards its solution.
- Develop skills to design experiments and analyze data through electronic instrumentation and devices, and computer control.
- Establish expertise in focused areas of physical theory and experiment.
- Generate fluency of the scientific enterprise and awareness of possible career paths available to the undergraduate physics major.

Our BA Astronomy and BS Astrophysics program learning objectives are:

- Apply basic physical principles to astronomical situations.
- Formulate scientific problems in mathematical terms and find solutions.
- Design research projects using professional telescopes, archival data, or numerical simulations.
- Establish competence in focused areas of astrophysics.
- Value science as a way to illuminate our place in the universe.

IV. REQUIRED TEXTS AND READINGS

No textbook; readings will be provided.

V. COURSE ASSIGNMENTS, EVALUATION AND GRADING

Grading Scale. A: $\geq 90\%$, B: $\geq 80\%$, C: $\geq 70\%$, D: $\geq 60\%$, F: $< 60\%$. Plus and minus grades may be given at the instructor's discretion.

Oral Presentations. You will give at least one group and two individual presentations during the semester. Presentations should focus on description of contemporary or historical incidents, discussion of the ethical aspects, and recommendations for handling similar situations in the future. Typically, two or three presentations will be given per class, with time for questions and discussion. All students will fill out forms providing feedback to the speaker; the instructor will collate these and add a grade based on the attached rubric (p. 7). Individual and group presentations count for 40% and 20% of your grade, respectively.

Class Discussions. Following each Oral Presentation (above), and/or on subsequent days as noted in the Calendar (p. 5), we will discuss the ethical issues raised. All students are required to contribute (e.g., by asking questions, offering other perspectives, or noting further points). You will be graded on the content and quality of your contributions to the discussion using the Group Activity Guidelines (below). Class discussions count for 20% of your grade.

Final Discussions. Following a presentation on an issue of scientific ethics given by the instructor, students will split into groups, with each group assigned a specific question to discuss. The groups will then present their conclusions to the class as a whole. Discussions within groups and presentation of conclusions will be graded using the Group Activity Guidelines (below). The final discussion counts for 20% of your grade.

Group Activity Guidelines. During group activities in class, you are expected to follow these guidelines, which are similar to expectations in workplace meetings and team projects.

- **Read:** Come to class prepared to discuss the reading and any homework material.
- **Risk:** Be open with your opinions and your questions. Listen to and encourage everyone's ideas so that they can take risks too.
- **Relax:** Don't take criticism of your own ideas personally. Change your mind when evidence shows that you should.
- **Respect:** Act toward your peers as you would have them act towards you. Be civil and charitable.
- **Reason:** Play the skeptic by being critical of reasoning, ideas, and data, *not* of people. Consider the extreme cases to try to understand the underlying principles.
- **Restate:** Try to paraphrase another's explanation if it is unclear to you. Try to put ideas together in a way that makes sense. Focus on finding the best possible answer as a group.

Common Courtesy Guidelines. These guidelines are for the benefit of the entire class:

- Show up on time; if you're not well, let me know before class starts.
- Silence cell phones and turn off laptops, tablets, etc, *except as needed for class*.
- Be kind and respectful of your classmates and instructors.

Academic Honesty. This should be a given for an ethics course! Nonetheless, it bears repeating that putting ideas or descriptions into **your own words** helps you to identify which areas you don't understand and helps you learn how to communicate scientifically with your peers. Note that the University of Hawai'i has an explicit policy on plagiarism, described in the paragraph on **Academic Integrity** above.

We should discuss the use of generative A.I. tools (e.g., ChatGPT) in depth this semester. In the interim, please **acknowledge any A.I. tools** you use in your work for this course.

Tips for Doing Well.

- **Show up!** Lectures may include in-class questions, collaborative discussions, and tutorials. Answers will be developed in class, not found in the lecture notes or readings. Your success in this class depends on and is enhanced by your active participation.
- **Come prepared.** Bring a writing implement and paper or a notebook for taking notes.
- **Get help early.** If you are confused by aspects of the coursework or you feel that you are falling behind, get in touch immediately. We will work with you to help you succeed, no matter what is causing the difficulty.
- **Don't procrastinate.** Start preparing presentations early. If you leave them to the last minute, you won't be able to take the time needed to deeply understand the material, nor get help should you need it. Presentations **must** be given on scheduled dates, unless you have a doctor's note.

VI. CALENDAR

08/25	Introduction. Approaches to ethics.
09/01	Example presentation and discussion (zoom).
09/08	Ethical topics. Presentation guidelines. Rubrics.
09/15	Group presentations [$\sim 12 \text{ min} \times 4$].
09/22	Class discussion & instructor feedback on presentations.
09/29	Individual presentations [$\sim 15 \text{ min} \times 3$].
10/06	Individual presentations [$\sim 15 \text{ min} \times 3$].
10/13	Individual presentations [$\sim 15 \text{ min} \times 3$].
10/20	Group presentations [$\sim 25 \text{ min} \times 2$].
10/27	Class discussion & instructor feedback on presentations.
11/03	Individual presentations [$\sim 15 \text{ min} \times 3$].
11/10	Holiday: Veterans Day.
11/17	Individual presentations [$\sim 15 \text{ min} \times 3$].
11/24	Holiday: Native American Heritage Day.
12/01	Individual presentations [$\sim 15 \text{ min} \times 3$].
12/13	Final discussion.

IMPORTANT DATES

08/21–12/07	Fall 2023 Semester	10/30	Last day to drop
08/25	First class meeting	11/10	Holiday: Veterans Day
08/29	Last day to add course or change grade option	11/23–11/24	Holiday: Thanksgiving
		12/01	Last class meeting
09/04	Holiday: Labor Day	12/11–12/15	Final Exam Period
09/12	Last day to drop course w/o a 'W'	12/13	Final class discussion
		12/19	Fall 2019 grades due

University of Hawai‘i at Mānoa (UHM) TITLE IX SYLLABUS INFORMATION

UHM is committed to providing a learning, working and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. If you or someone you know experiences any of these, UHM has staff and resources on campus to support and assist you. Staff also can direct you to resources in the community. Here are some:

If you wish to remain ANONYMOUS, speak with someone CONFIDENTIALLY, or would like to receive information and support in a CONFIDENTIAL setting, contact:

- Counseling & Student Development Center* (808) 956-7927
manoa.hawaii.edu/counseling/
- Office of Gender Equity* (808) 956-9499
geneq@hawaii.edu
- Lesbian, Gay, Bisexual, Transgender, Queer (LGBTQ+) Center (808) 956-9250
manoa.hawaii.edu/lgbt
- Respondent Support (808) 956-4392
PAUrs@hawaii.edu
- Student Parents at Mānoa (SP@M)* (808) 956-8059
manoa.hawaii.edu/studentparents/
- UH Confidential Advocacy* (Natalia Villegas) (808) 341-4952
nataliat@hawaii.edu
- University Health Services Mānoa* (808) 956-8965
hawaii.edu/shs/
- <http://www.manoa.hawaii.edu/titleix/resources.html#confidential>

(* Confidential Resource)

If you wish to REPORT an incident of sex discrimination or gender-based violence including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence or stalking as well as receive information and support, contact:

Dee Uwono
Director and Title IX Coordinator
Hawai‘i Hall 124
2500 Campus Road
Honolulu, HI 96822
(808) 956-2299
t9uhm@hawaii.edu

As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator. Although the Title IX Coordinator and I cannot guarantee confidentiality, you will still have options about how your case will be handled. My goal is to make sure you are aware of the range of options available to you and have access to the resources and support you need. For more information regarding sex discrimination and gender-based violence, the University’s Title IX resources and the University’s Policy, EP 1.204, go to: <http://www.manoa.hawaii.edu/titleix/>

Ethics Presentations Rubric Zero may be assigned to any category for which work does not meet column one (1) level performance
 Content fraction: _____ % of required content was addressed (instructor specified for Introduction, Observations, Results, & Discussion)

	Capstone (3) - skill is used well	Progressing (2) - skill is used with noticeable but not distracting errors	Introduction (1) - skill is attempted, but not yet used effectively; distracting errors
Content	<input type="checkbox"/> Framework: identify and use relevant ethical models <input type="checkbox"/> "The Facts": historical context, what happened and when? <input type="checkbox"/> Consequences for the individuals involved and for the field in general <input type="checkbox"/> Discussion: trends, patterns, and recommendations for future situations	<input type="checkbox"/> Using multiple frameworks in muddled fashion <input type="checkbox"/> "The Facts": one or two key facts omitted or misstated <input type="checkbox"/> Consequences for individuals and field are addressed in shallow manner <input type="checkbox"/> Incomplete or unrealistic recommendations	<input type="checkbox"/> Mention ethical frameworks but not specify which one is being used! <input type="checkbox"/> Enough facts are given for an expert to "fill-in-the blanks" <input type="checkbox"/> Incomplete discussion of the consequences - discuss individuals or field, but not both <input type="checkbox"/> Recommendations are vague and general, not useful
Reasoning	<input type="checkbox"/> Each step of ethical evaluation from introduction to conclusion is justified <input type="checkbox"/> All events and perspectives are taken into account <input type="checkbox"/> Consider charitable interpretations	<input type="checkbox"/> Enough justification to see the shape of the argument <input type="checkbox"/> Multiple perspectives noted, but not necessarily addressed well <input type="checkbox"/> Not fully informed interpretation	<input type="checkbox"/> Only a few steps are justified <input type="checkbox"/> Some key events or perspectives neglected <input type="checkbox"/> "Mustachioed villains!"
Control of syntax & mechanics	<input type="checkbox"/> Define terms and acronyms <input type="checkbox"/> Choose effective words <input type="checkbox"/> Sentences are clear and concise <input type="checkbox"/> Each slide & associated sentences builds steadily to a clear point <input type="checkbox"/> Introduction \Rightarrow develop topic \Rightarrow conclusion <input type="checkbox"/> Legible, uncluttered slides <input type="checkbox"/> Clear diction at a steady pace	<input type="checkbox"/> Most terms are defined <input type="checkbox"/> Acceptable word choices <input type="checkbox"/> A few unclear sentences <input type="checkbox"/> Each slide addresses a single point, but some don't build well <input type="checkbox"/> Useful progression, but some have mixed material <input type="checkbox"/> A few cluttered slides <input type="checkbox"/> One or two mumbles	<input type="checkbox"/> Terms & acronyms undefined <input type="checkbox"/> Confusing word choices <input type="checkbox"/> Some sentences were difficult to parse, but could still be understood <input type="checkbox"/> A few slides mix unrelated ideas <input type="checkbox"/> Train of thought attempted, but still several "back-and-forth" <input type="checkbox"/> Cluttered slides <input type="checkbox"/> Occasionally unclear speech
Speaking & presentation tools (useful techniques; not always needed)	<input type="checkbox"/> Connect with audience using gaze, pacing, gestures, projection of voice <input type="checkbox"/> Key information is in usefully organized tables and/or well-placed in text or lists <input type="checkbox"/> Key data, trends, and models are shown in figures and/or described <input type="checkbox"/> Citations point reader to credible sources of needed prior knowledge <input type="checkbox"/> Clear introduction: WHY, HOW, & WHAT	<input type="checkbox"/> Some use of gaze, pacing, gestures, projection of voice <input type="checkbox"/> A few pieces of key information are hard to find, skipped, or out of place <input type="checkbox"/> A few irrelevancies are mixed with data, trends, or models <input type="checkbox"/> A few missing or unneeded citations <input type="checkbox"/> Intro addresses WHY, HOW, & WHAT but isn't clear	<input type="checkbox"/> Occasionally attempt using gaze, pacing, gestures, projection of voice <input type="checkbox"/> Tables or lists are attempted, but mix concepts or leave out key items <input type="checkbox"/> Irrelevant data, trends, and models are emphasized <input type="checkbox"/> Many missing or unneeded citations <input type="checkbox"/> Introduction attempted but missing WHY, HOW, or WHAT

G. Mathews & S. Habbal, inspired by AAC&U Written Communication, Inquiry Analysis, Quantitative Literacy and VALUE Rubrics. Revised 2019/09/05 by JEB.